SURGERY FOR ACQUIRED CARDIOVASCULAR DISEASE

EDITORIAL: THE MITRAL HOMOGRAFT—IS IT WORTHWHILE?

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In this issue of the *Journal*, Kumar and associates[1] raise a number of important points related to the clinical use of mitral homografts. Their rather negative results obtained with antibiotic-preserved mitral homografts need to be carefully analyzed before discarding this operation which, in my opinion, could be a useful surgical alternative for the treatment of a particular subset of patients in whom repair is not possible. At present, no satisfactory substitute for mitral valve replacement exists. The morbidity of prostheses is higher in the mitral than in the aortic position: thromboembolic and hemorrhagic complications in the case of mechanical prostheses and early degeneration in the case of bioprostheses. Furthermore, exclusion of the mitral valve apparatus results in changes of left ventricular geometry and impairment of left ventricular function. Thus, replacement of the mitral valve with a homograft offers an attractive alternative because it would avoid the need for permanent anticoagulation, maintain physiologic flow characteristics, and retain normal annulopapillary continuity. Nevertheless, to date the use of mitral homografts has been restricted to few centers; the difficulty of implantation remains the main obstacle to their use.

My colleagues and I have been using homograft mitral valve techniques since 1992,[1] and our experience encompasses 102 patients. The operative technique included the following characteristics: (1) partial or total replacement according to the extent of the lesions, (2) fixation of the donor papillary muscle side to side to the recipient's papillary muscle with separated non–pledget-supported sutures, and (3) systematic use of a prosthetic ring to compensate for imperfections.

Implantation of a mitral homograft is a complex procedure necessitating good exposure of the subvalvular mitral apparatus. Occasionally, anatomic findings such as severe left ventricular hypertrophy or nondilated and noncompliant left atrium, which reduce visibility of the mitral valve, cannot be circumvented, making the procedure technically impossible. Partial homograft replacement has been limited and, in our most recent experience, complete homografts were generally used.[2]

Due to the variable and unpredictable morphology of the papillary muscles, their fixation can be easy and reproducible when the papillary muscles have a single and narrow head or difficult when bulky or divided into multiple heads. We have been pleased that there has been no instance of postoperative papillary muscle dehiscence. Inspection of the papillary muscles at reoperation revealed a remarkable anatomic appearance and excellent healing of the suture line with endothelialization and fibrosis.

Since the beginning of our experience, an annuloplasty ring has been systematically inserted at the end of the procedure. The use of a slightly undersized ring allows us to compensate for the unavoidable asymmetries in valvular geometry and to adapt the size of the mitral orifice to the size of the homograft. In addition, the use of a prosthetic ring provides an increased surface for leaflet coaptation, thereby releasing the tension on the papillary muscle suture line. In this regard, it is interesting to observe that the incidence of papillary muscle dehiscence was higher in the report by Kumar and associates, in which an annuloplasty was performed in only half of the cases.

As expected, a prosthetic ring reduces the mitral area: the functional area was measured at 2 to 3 cm^2 in our series[2] as compared with 3 to 4 cm^2 in Kumar's series. It can be concluded that the addition of a prosthetic ring increases the reliability of the procedure at the price of a mild reduction in orifice area.

In our experience, the main limitation of the mitral homograft has been the risk of valve dysfunction due to a severe mismatch at implantation that could not be cor-

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rected with a prosthetic ring. Ignoring or minimizing an unsatisfactory echocardiographic result will lead to an early reoperation. This risk might invalidate the indication for this operation in areas of the world in which a second procedure cannot be economically afforded by the patient.

At present, it is difficult to assess the long-term outcome of mitral homografts due to the bias introduced by early valve dysfunction. In our experience, normal valve function was present in 80% of the cases at a 41-month follow-up period. Reoperation should be imputed to structural deterioration only in those patients whose initial result was fully satisfactory. In our series, degeneration of the homograft was identified in only 3 patients. It is widely known that the type of homograft preservation influences the late outcome: cryopreservation was used in our series, whereas Kumar's series included mainly antibiotic-preserved valves, which may also account for the differences in results between the two reports.

Seven years of experience with mitral homografts has shown that (1) rheumatic etiology could be the prime indication for this technique, (2) the side-to-side technique of papillary muscle implantation is reliable, and (3) the use of a prosthetic ring is necessary to ensure satisfactory results. However, we agree with Kumar and associates that, at present, the mitral homograft is not yet a standardized procedure to be undertaken routinely, does not assure success in every case, and is not applicable to all mitral replacements. The mitral homograft still belongs to the field of clinical research and its use should not be widespread but limited to a few centers. An improvement in the method of measuring the mitral valve is necessary so as to appropriately select the homograft.

Despite possible refinements in the future, the operation will certainly remain challenging. If one day the technical difficulties can be circumvented, as for aortic homografts, durable results can be expected. Whether this experience should be continued is answered by the absence of a satisfactory mitral prosthesis.

REFERENCES

1. Kumar AS, Choudhary SK, Mathur A, Saxena A, Roy R, Chopra P. Homograft mitral valve replacement: five years' results. J Thorac Cardiovasc Surg 2000;120:450-8.
2. Acar C, Farge A, Ramsheyi A, et al. Mitral valve replacement using a cryopreserved mitral homograft. Ann Thorac Surg 1994; 57:746-8.
3. Acar C, Tolan M, Berrebi A, et al. Homograft replacement of the mitral valve: graft selection, technique of implantation, and results in forty-three patients. J Thorac Cardiovasc Surg 1996;111:367-80.